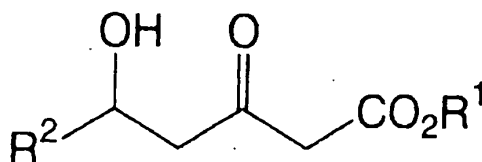


CLAIMS

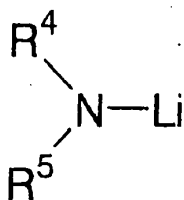
1. A process for producing a 5-hydroxy-3-oxopentanoic acid derivative of the following formula (IV):



(IV)

- 10 wherein R¹ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group
- 15 and an alkoxycarbonyl group,

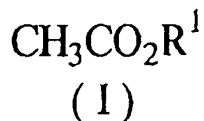
which comprises permitting a lithium amide of the following formula (III):



(III)

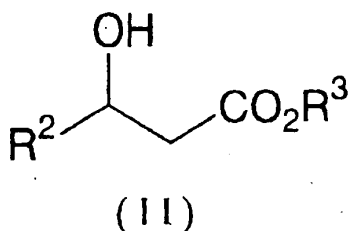
- 20 wherein R⁴ and R⁵ may be the same or different and each represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms, an aralkyl group of 7 to 12 carbon atoms and a silyl group,

to act upon a mixture of an acetic acid ester of the following formula (I) and a 3-hydroxypropionic acid derivative of the following formula (II) at a temperature not below -20 °C:



5

wherein R¹ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms:



10

wherein R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxycarbonyl group; R³ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R² and R³ may be joined to each other to form a ring.

20

2. The process according to Claim 1

wherein, referring to the lithium amide, R⁴ and R⁵ each represents an isopropyl group.

25

3. The process according to Claim 1 ~~or 2~~

wherein, referring to the acetic acid ester, R¹

represents a tert-butyl group.

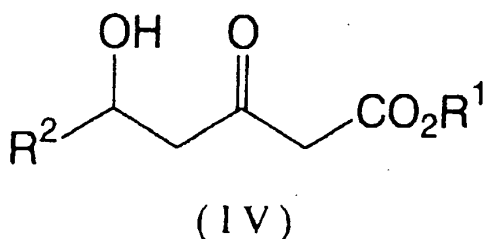
a

4. The process according to Claim 1, ~~2 or 3~~
wherein a magnesium halide is added in permitting the
5 lithium amide to act.

5. The process according to Claim 4
wherein magnesium chloride is used as the magnesium
halide.

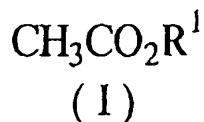
10

6. A process for producing a 5-hydroxy-3-oxopentanoic
acid derivative of the following formula (IV):

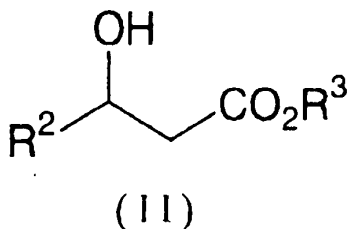


- 15 wherein R¹ represents any of an alkyl group of 1 to 12 carbon
atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group
of 7 to 12 carbon atoms; and R² represents any of hydrogen, an
alkyl group of 1 to 12 carbon atoms which may have a substituent,
an alkenyl group of 2 to 12 carbon atoms which may have a
20 substituent, an aryl group of 6 to 12 carbon atoms which may
have a substituent, an aralkyl group of 7 to 12 carbon atoms
which may have a substituent, a cyano group, a carboxyl group
and an alkoxycarbonyl group,

- which comprises treating a mixture of an acetic acid ester
25 of the following formula (I) and a 3-hydroxypropionic acid
derivative of the following formula (II):

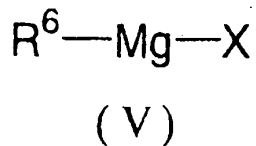


wherein R^1 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms:



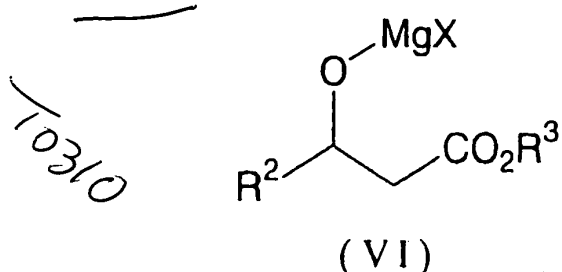
wherein R^2 represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxycarbonyl group; R^3 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R^2 and R^3 may be joined to each other to form a ring,

with a Grignard reagent of the following formula (V):



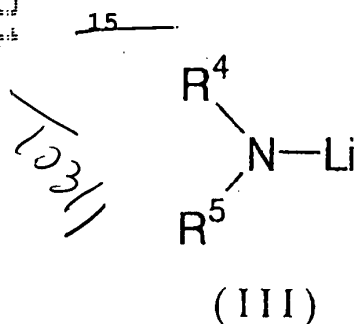
20 wherein R^6 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and X represents halogen,

to prepare a mixture of a compound of the following formula (VI) and an acetic acid ester of the above formula (I):



wherein R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxycarbonyl group; R³ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; R² and R³ may be joined to each other to form a ring; and X represents a halogen atom,

and permitting a lithium amide of the following formula (III):



wherein R⁴ and R⁵ may be the same or different and each represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms, an aralkyl group of 7 to 12 carbon atoms and a silyl group

to act upon the mixture at a temperature not below -20 °C.

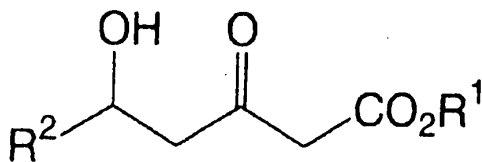
7. The process according to Claim 6

wherein, referring to the lithium amide, R^4 and R^5 each is an isopropyl group.

a 8. The process according to Claim ~~6 or 7~~
 5 wherein, referring to the acetic acid ester, R^1 represents a tert-butyl group.

a 9. The process according to Claim ~~6, 7 or 8~~
 10 wherein, referring to the Grignard reagent, R^6 represents a tert-butyl group and X represents a chlorine atom.

10. A process for producing a 5-hydroxy-3-oxopentanoic acid derivative of the following formula (IV):

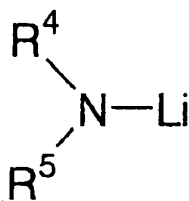


(IV)

15

wherein R^1 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R^2 represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent,
 20 an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxy carbonyl group,

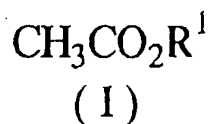
25 which comprises permitting a lithium amide of the following formula (III):



(III)

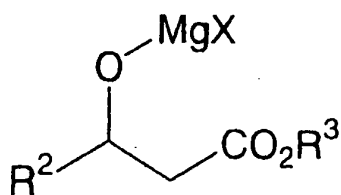
wherein R^4 and R^5 may be the same or different and each represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms, an aralkyl group of 7 to 12 carbon atoms and a silyl group,

to act upon a mixture of an acetic acid ester of the following formula (I) and a compound of the following formula (VI) at a temperature not below -20°C :



(I)

wherein R^1 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms:



(VI)

wherein R^2 represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent,

a cyano group, a carboxyl group and an alkoxy carbonyl group; R^3 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; R^2 and R^3 may be joined to each other to
 5 form a ring; and X represents a halogen atom.

11. The process according to Claim 10
 wherein, referring to the lithium amide, R^4 and R^5 each represents an isopropyl group.

10

a 12. The process according to Claim ~~10 or 11~~
 wherein, referring to the acetic acid ester, R^1 represents a tert-butyl group.

15

a 13. The process according to Claim ~~10, 11 or 12~~
 wherein, referring to the compound (VI), X represents a chlorine atom.

20

a 14. The process according to ~~any of Claims 1 to 13~~ ^{Claim 1}
 wherein R^3 is a methyl group or an ethyl group.

25

a 15. The process according to ~~any of Claims 1 to 14~~ ^{Claim 1}
 wherein R^2 is a chloromethyl group, a cyanomethyl group or a benzyloxymethyl group.

a

16. The process according to ~~any of Claims 1 to 13~~ ^{Claim 1}
 wherein R^2 and R^3 are joined to each other to form a methylene group.

30

a 17. The process according to ~~any of Claims 1 to 16~~ ^{Claim 1}
 wherein the compound (II) or (VI) is optically active.

Add
 A1